

REMARKS

Claims 1-29 remain pending in the present application. Reconsideration of the claims is respectfully requested.

I. ASSERTED ANTICIPATION**1.A Claim 1**

The examiner rejects claims 1-4, 7-15, 20, and 27-29 as anticipated by *Itagaki*, Surface-Emitting Laser Diode Array and Driving Method Thereof, Photodetector, Photodetector Array, Optical Interconnection System, and Multi Wavelength Optical Communications System, U.S. Patent 5,602,863 (Feb. 11, 1997). Applicants respectfully traverse this rejection.

With respect to Claim 1 the examiner states:

With respect to Claim 1, *Itagaki* shows in fig. 3 a surface emitting semiconducting laser device 100 comprising a waveguide having separate first order reflector gratings 16 at both ends of said waveguide on a first surface on the laser device; an outcoupling location positioned between said gratings on said waveguide, to couple light out of said waveguide through said first surface of the laser device 100.

Office Action December 6, 2004, page 2.

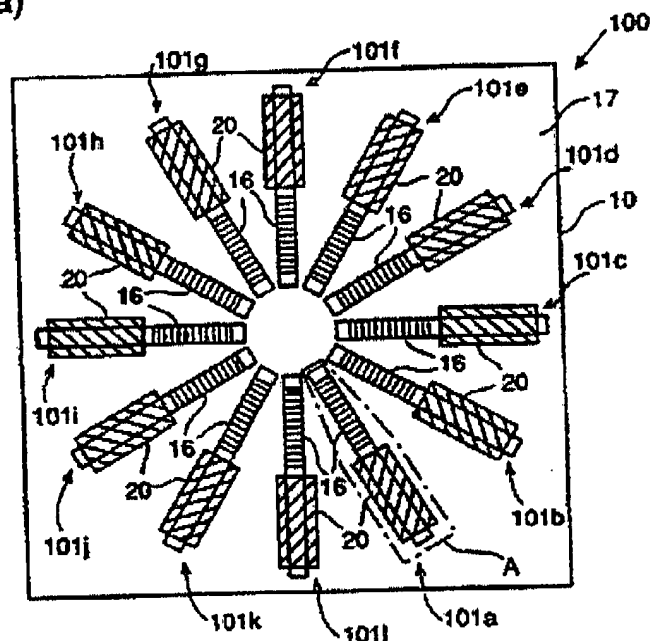
Claim 1, which is representative of Claims 2-4 provides as follows:

1. A surface emitting semiconducting laser device, comprising:
 - a waveguide having separate first order reflector gratings at both ends of said waveguide on a first surface of the laser device;
 - an outcoupling location positioned between said gratings on said waveguide, to couple light out of said waveguide through said first surface of the laser device.

Itagaki does not anticipate Claim 1 because *Itagaki* does not show every element of Claim 1. The examiner misapprehends *Itagaki*. *Itagaki* shows a surface emitting laser diode array including a plurality of individual opposing surface emitting laser diodes with secondary diffraction gratings produced at the same pitch. These individual laser diodes are radially arranged on a substrate with an empty space at the center of the radial

arrangement so that the secondary diffraction gratings face to the center point. Figure 1A of *Itagaki* shows *Itagaki's* structure.

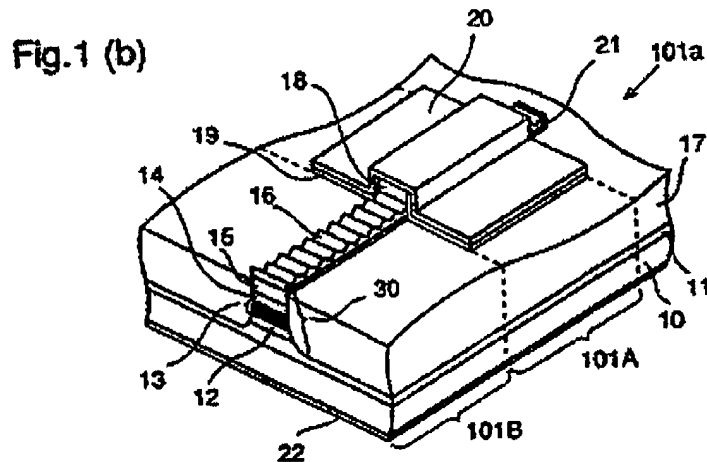
Fig.1 (a)



As Figure 1 shows, every instance of reference numeral 16 is a diffraction grating. Reference numeral 20 is a p-side electrode. Reference numerals 101a through 101l point to individual laser diodes, which include the diffraction grating and the electrode. As Figure 1A of *Itagaki* clearly shows, *Itagaki* does not show a *single* waveguide having separate first order reflector gratings *at both ends* of a single waveguide on the first surface of a laser device as claimed in claim 1. Each individual laser in *Itagaki* only has a diffraction grating on *one side*.

If the examiner contends that two opposite laser diodes on *Itagaki's* device, such as reference numerals 101i and 101c, show a waveguide having separate first order reflector gratings at both ends of said waveguide as claimed, then the examiner is incorrect. If the examiner treats two of *Itagaki's* lasers as a single waveguide, then first order reflector gratings are not present *at both ends* of the waveguide, as claimed. Thus, again, *Itagaki* does not show or suggest the limitations of claim 1.

In addition, even if item 21 shown in Figure 1B could be considered a first order grating, *Itagaki* does not show an outcoupling location position between said gratings on said waveguide decoupled light out of said waveguide as claimed in Claim 1. Figure 1B is as follows:



Even if item 21 were incorrectly characterized as a first order reflector grating, the only location where *Itagaki* could emit light through an outcoupling in such a way as to anticipate claim 1 would be to emit light at the electrode, item 20. However, the electrode clearly is not an outcoupling. Instead, the only place where *Itagaki* is emitting light is from the diffraction gratings indicated by reference numerals 16. Light can be emitted only from these areas and not through the electrode shown as reference numeral 20. Therefore, *Itagaki* cannot show the limitation of an outcoupling between two gratings as claimed in claim 1.

Because none of the laser diodes, either alone or together, show or suggest the limitations of claim 1, *Itagaki* does not anticipate claim 1. The examiner asserts otherwise, pointing to Figure 3 of *Itagaki* and specifically referring to reference numerals 100 and 16. However, the examiner misapprehends *Itagaki*. Figure 3 of *Itagaki* provides as follows:

Fig.3

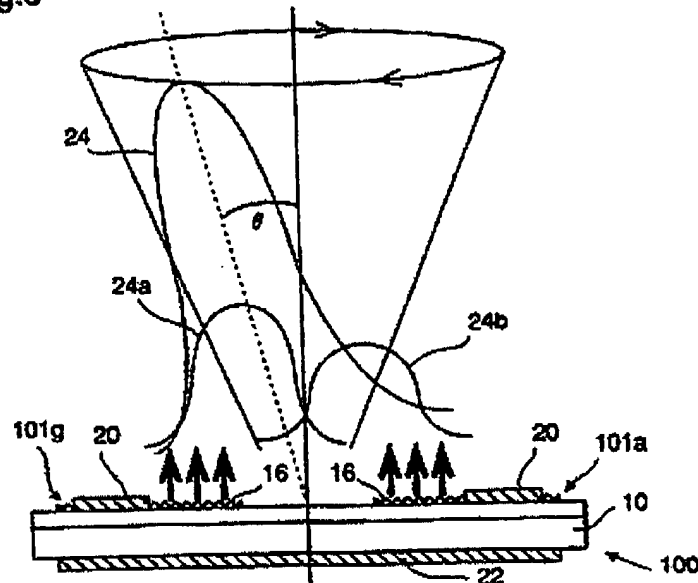


Figure 3 is merely a cross section of *Itagaki's* device shown in Figure 1A. The center section between the gratings at reference numeral 16 is merely the empty section that is the circular area between the laser diodes in Figure 1A. In fact, *Itagaki* shows that the laser light indicated by the arrows coming from reference numeral 16 is emitted only from the gratings from reference numeral 16. Light does not emit from the electrodes at reference numeral 20, or even from the areas near arrows 101g and 101a. Thus, Figure 3 actually proves that *Itagaki* does not show the claimed limitation of first order reflector gratings at both ends of a waveguide. Even if the examiner incorrectly treated 101a and 101g as a single waveguide, reflector gratings are not present *at both ends* of the waveguide. Thus, *Itagaki* does not anticipate claim 1.

In addition, Figure 3 also clearly shows no outcoupling positioned between the gratings on the waveguide, as claimed in Claim 1. In the claimed invention, the outcoupling is located between gratings on *one* laser. As a result, light is efficiently coupled out of the one laser because multiple passes of the light occur under the outcoupling.

In contrast, *Itagaki* shows a device in which light gets a single pass under the grating before being emitted from each individual laser. In addition, each laser shown in *Itagaki* shows light emitting from one end of each laser diode without multiple passes. Thus, no outcoupling exists between the gratings of any laser in *Itagaki*. The central area is empty space and in no way can be considered an outcoupling, as claimed. Thus, again, *Itagaki* does not anticipate claim 1.

The examiner appears to have misapprehended *Itagaki* and therefore misconstrued the central area as an outcoupling to couple light out of a waveguide through the first surface of the laser device, as claimed. Even if the empty space were considered an outcoupling of a single waveguide comprising 101g and 101a, the outcoupling does not couple light *through the first surface* of the laser device as claimed. Thus, again, *Itagaki* does not anticipate claim 1.

In general, the examiner appears to have misunderstood *Itagaki* and misapplied it to claim 1. From the figures and supporting text in *Itagaki*, *Itagaki* clearly does not show the invention claimed in claim 1. Thus, Applicants have overcome the rejection of claim 1.

I.B Claims 2-4

Regarding claims 2-4, claims 2-4 depend from claim 1 and therefore are also not anticipated by *Itagaki*. Furthermore, claims 2-4 contain other patentable features over *Itagaki* and therefore are also allowable over *Itagaki*. For example, claim 4 claims a device wherein said outcoupling location comprises first order grating which couples light out of said waveguide. As shown in Figures 1 and 3 of *Itagaki*, the central area of *Itagaki* is empty and therefore cannot be considered a first order grating as claimed in claim 4. No other structure in *Itagaki* can be an outcoupling comprising a grating in the manner claimed. Accordingly the rejection of claim 1-4 over *Itagaki* has been overcome.

I.C Claims 14, 15, and 27

With respect to claims 14, 15, and 27 the examiner states:

With respect to claims 14-15 and 27, *Itagaki* shows in fig. 3 a semiconductor laser device 100 comprising a cavity having reflectors 16 at either end and an outcoupling aperture to outcouple

light from said cavity; a gain region of said cavity located between said reflectors, said gain region having a first portion on one side of said outcoupling aperture and a second portion on the opposite side of said outcoupling aperture.

Office Action of December 6, 2004, page 3.

Again the examiner misunderstands *Itagaki* and misapplies *Itagaki* to the claims. Claim 14, which is representative of claim 15 and similar to claim 27, provides as follows:

14. A semiconductor laser device, comprising:
a cavity having reflectors at either end and an outcoupling aperture to outcouple light from said cavity;
a gain region of said cavity located between said reflectors, said gain region having a first portion on one side of said outcoupling aperture and a second portion on the opposite side of said outcoupling aperture.

Like claim 1, claim 14 claims a cavity having an outcoupling aperture to couple light from said cavity, where the cavity has reflectors at either end. Again, reflectors are not shown at either end of a cavity in *Itagaki*. Therefore, for similar reasons described with regard to claim 1, *Itagaki* does not anticipate claims 14, 15, and 27.

In addition, with respect to claim 15, *Itagaki* does not show a device wherein the first portion of said gain region has two parts, one of said parts being used to modulate said device, and the examiner has not shown how *Itagaki* shows this feature. Thus, *Itagaki* does not anticipate claim 15.

The examiner asserts otherwise, again referring to figure 3 and reference numerals 100 and 16. However, as described above, figure 3 of *Itagaki* actually shows that the examiner has misunderstood the reference and misapplied it to the claims. Figure 3 shows that *Itagaki* does not anticipate claims 14, 15, and 27, as described above. Therefore, the rejection of claims 14, 15, and 27 over *Itagaki* has been overcome.

I.D Claims 7 and 8

With respect to claims 7 and 8 the examiner states as follows:

With respect to claims 7-8, *Itagaki* discloses in Fig. 3 a waveguide structure having first and second reflectors 16; a first set of

electrodes 20 connected to pump a first gain region portion of said waveguide structure adjacent to said first reflector; a second set of electrodes 20 connected to pump a second gain region portion of said waveguide structure adjacent to the second reflector; an outcoupling aperture positioned between said first and second gain region portions on said waveguide structure, to couple light out of said waveguide structure.

Office Action of December 6, 2004 pages 3-4.

Again, the examiner has misunderstood and misapplied *Itagaki*. Although the examiner cites Figure 3 for the proposition that Figure 3 shows all the elements of claim 7, in actuality Figure 3 shows the opposite conclusion. Claim 7 claims a waveguide structure having first and second reflectors at either end of the waveguide. Claim 7 also claims an outcoupling aperture position between the first and second gain region portions on said waveguide structure. Claim 7 also claims first and second sets of electrodes. However, as described with regard to claim 1, each individual laser diode shown in *Itagaki* has only one electrode and does not show first and second reflectors at either end of the waveguide as claimed. Likewise, as described with respect to claim 1, *Itagaki* does not show an outcoupling aperture. Thus, *Itagaki* does not anticipate claims 7 and 8 and Applicants have overcome the rejection of claims 7-8.

II. ASSERTED OBVIOUSNESS

II.A Claims 5 and 7-19

The examiner rejects claims 5 and 7-19 as obvious over *Itagaki* in view of *Schimpe, Cylindrical Diffraction Grating Couplers and Distributed Feedback Resonators for Guided Wave Devices*, U.S. Patent 4,743,083 (May 10, 1998). Applicants respectfully traverse this rejection. The examiner states that:

With respect to claims 5 and 18, *Itagaki* disclose all limitations of the claims except for the reflective surface. *Schimpe* teaches reflective surface (col. 5, 1.49). For the benefit of reflecting the light, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide *Itagaki* the reflective surface as taught by *Schimpe*.

With respect to claim 17, *Schimpe* discloses the dielectric coating (col. 27, 1.44).

With respect to claim 19, *Schimpe* discloses a grating with circular grating 20 in Fig. 1A.
Office Action of December 6, 2004, page 5.

As shown above, *Itagaki* does not show all the elements of the independent claim from which claims 5 and 17-19 depend. Therefore, the examiner has failed to state a prima facie obviousness rejection of these claims.

In addition, the examiner has failed to state a prima facie obviousness rejection because the examiner has not stated a motivation to combine the references. The examiner states that for "the benefit of the reflective light," it would have been obvious to provide *Itagaki* the reflective surface as taught by *Schimpe*. However, the examiner has not provided any reason why reflecting light in this particular instance would be of any benefit. The examiner has not shown that one of ordinary skill would recognize the advantage. The examiner has not provided any indication that one of ordinary skill would have a motivation to modify the references as necessary in order to achieve the claimed invention. Therefore, the examiner has failed to state a prima facie obviousness rejection.

In addition, the statement "for the benefit of reflecting the light" is so overly broad as to be useless as a motivation to combine the references. Light is reflected in nearly every optical device ever created. Therefore, the benefit of reflecting light provides no motivation to one of ordinary skill to modify or combine the references in the manner required to result in the claimed invention. Furthermore, in view of the fact that *Itagaki* is so far away from the claimed inventions and from *Schimpe*, no reason exists to believe that one of ordinary skill would be motivated to combine the references at all. Therefore, the examiner has again failed to state a proper motivation to combine the references and has failed to state a prima facie obviousness rejection.

In addition, the examiner's statement is so overly broad that it indicates the examiner has simply picked and chosen elements from different aspects of the art, combined them together and used Applicants own disclosure as a motivation to combine the references. Because the statement is so overly broad, the examiner must have used impermissible hindsight when fashioning the obviousness rejections. Doing so is

improper. Thus, the examiner has again failed to state a prima facie obviousness rejection. Accordingly, the rejection of claims 5 and 7-19 has been overcome.

Moreover, because *Itagaki* and *Schimpe* are so different from each other, the examiner must have simply picked an element out of *Schimpe* and included that element in *Itagaki* without having sufficient reason or justification to do so. Merely picking and choosing elements from references again indicates that the examiner has used impermissible hindsight when combining the references. Accordingly, the examiner has again failed to state a prima facie rejection against these claims.

In addition, the claims are non-obvious in view of *Itagaki* and *Schimpe* because *Itagaki* and *Schimpe* show extremely different inventions. *Itagaki* shows a surface emitting diode array and *Schimpe* shows cylindrical diffraction grating couplers. No reason exists why one of ordinary skill would recognize how any device in *Schimpe* would be functional in *Itagaki*, and the examiner has failed to cite any reason or motivation to combine such extremely different references. Thus, there is no motivation to combine the references and accordingly the claims are non obvious in view of *Itagaki* and *Schimpe*.

II.B Claim 16

The examiner has rejected claim 16 as obviousness over *Itagaki* in view of *Horimai et al.*, Apparatus and Method for Recording and/or Playing Back Optical Information and Media for IT Apparatus and Method for Recording and/or Playing Back Optical Information and Media for Them, U.S. Patent 5,917,798 (Jun. 29, 1999).

The examiner states that:

Claim 16 is rejected under 37 U.S.C. 103(a) as being unpatentable over *Itagaki* (US5602863) in view of *Horimai et al* (US5917798). *Itagaki* discloses all limitations of the claim except for the beam splitter. *Horimai* teach the beam splitter 17 in Fig. 2. For the benefit of spitting the laser beam, it would have been obvious of one having ordinary skill in the art at the time the invention was made to *Itagaki* the beam splitter as taught by *Horimai*.

Office Action of December 6, 2005, pages 5 through 6.

As shown above, *Itagaki* does not show all the elements of the independent claim from which claim 16 depends. Therefore, the examiner has failed to state prima facie obviousness rejection of claim 16.

In addition, the examiner failed to state a prima facie obviousness rejection because the examiner failed to state a motivation to combine the references. The examiner states that “for the benefit of splitting a laser beam” it would have been obvious “to *Itagaki* the beam splitter as taught by *Horimai*.” This statement is not a motivation to combine the references. Therefore, the examiner has failed to state a prima facie obviousness rejection.

In addition, the statement “for the benefit of splitting a laser beam” cannot be a proper motivation to combine the references. The examiner provides no indication how splitting the laser beam in *Horimai* would be of any benefit to the device shown in *Itagaki*. Given the very common use of beam splitters in many different optical devices, the examiner would have to provide a much more detailed reason why one of ordinary skill would be motivated to add a beam splitter to *Itagaki* in a manner that would result in the claimed inventions, even if *Itagaki* actually showed the claimed limitations as the examiner asserts. Therefore, the examiner has not stated a proper motivation to combine the references and accordingly has failed to state a prima facie obviousness rejection against claim 16.

In addition, the examiner’s statement is so overly broad that it indicates the examiner has simply picked and chosen elements from different aspects of the art and combined them together using Applicants’ own disclosure as a motivation to combine the references. Doing so is impermissible hindsight. Thus, the examiner has failed to state a prima facie obviousness rejection of claim 16. Accordingly, the rejection of claim 16 has been overcome.

Furthermore, because *Itagaki* and *Horimai* are so different from each other, the examiner must have simply picked an element out of *Horimai* and included that element in *Itagaki* without having sufficient reason or justification to do so. Merely picking and choosing elements from references again indicates that the examiner has used impermissible hindsight when combining the references. Accordingly, the examiner has again failed to state a prima facie rejection against these claims.

In addition, the claims are non-obvious in view of *Itagaki* and *Horimai* because *Itagaki* and *Horimai* show extremely different inventions. *Itagaki* shows a surface emitting diode array and *Horimai* shows a complicated set of lenses and mirrors to record information in the form of a hologram. There is absolutely no reason why one of ordinary skill would recognize how any device in *Horimai* would be functional in *Itagaki*, and the examiner has failed to cite any reason or motivation to combine such extremely different references. Thus, no motivation exists to combine the references and accordingly the claims are non obvious in view of *Itagaki* and *Horimai*.

II.C Claim 6

The examiner rejects claim 6 as being obvious over *Itagaki* in view of *Pepper*, Laser Systems with Improved Performance and Reduced Parasitics and Method, U.S. Patent 5,926,494 (Jul. 20, 1999). The examiner asserts that:

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Itagaki* (US5602863 in view of *pepper* (US5926494). *Itagaki* disclose all limitations of the claim except for the holographic optical element. *Pepper* teaches the holographic lens (col. 8, 1.55). For the benefit of obtaining a good light beam, it would have been obvious to one having ordinary skill in the art at the time the invention was made to *Itagaki* the holographic lens as taught by *Pepper*.

Office Action of December 6, 2004, page 6.

As shown above, *Itagaki* does not show all the elements of the independent claim from which claim 6 depends. Therefore, the examiner has failed to a state prima facie obviousness rejection of claim 6.

In addition, the examiner failed to state to state a prima facie obviousness rejection because the examiner failed to state a motivation to combine the references. The examiner states that for "obtaining a good light beam" it would have been obvious "to *Itagaki* the holographic lens as taught by *Pepper*." This statement is not a motivation to combine the references. Therefore, the examiner has failed to state a prima facie obviousness rejection.

In addition, the statement "for obtaining a good light beam" cannot be not a proper motivation to combine the references. The examiner provides no indication how the light beam would be better, what a "good" light beam is in the context of the claimed

invention, or why one of ordinary skill would recognize that the light beam was “good.” The examiner has not stated a reason how the device shown in *Pepper* would be of any benefit to the device shown in *Itagaki*. Therefore, the examiner has not stated a proper motivation to combine the references and accordingly has failed to state a prima facie obviousness rejection against claim 6.

In addition, the examiner’s statement is so overly broad that it indicates the examiner has simply picked and chosen elements from different aspects of the art and combined them together using Applicants’ own disclosure as a motivation to combine the references. Doing so is impermissible hindsight. Thus, the examiner has failed to state a prima facie obviousness rejection of claim 6. Accordingly, the rejection of claim 6 has been overcome.

Furthermore, because *Itagaki* and *Pepper* are so different from each other, the examiner must have simply picked an element out of *Pepper* and included that element in *Itagaki* without having sufficient reason or justification to do so. Merely picking and choosing elements from references again indicates that the examiner has used impermissible hindsight when combining the references. Accordingly, the examiner has again failed to state a prima facie rejection against these claims.

In addition, the claims are non-obvious in view of *Itagaki* and *Pepper* because *Itagaki* and *Pepper* show extremely different inventions. *Itagaki* shows a surface emitting diode array and *Pepper* shows a spatially modulated optical pump using mirrors and lenses. There is absolutely no reason why one of ordinary skill would recognize how any device in *Pepper* would be functional in *Itagaki*, and the examiner has failed to cite any reason or motivation to combine such extremely different references. Thus, no motivation exists to combine the references and accordingly the claims are non obvious in view of *Pepper* and *Horimai*.

II.D Claims 21, 22, and 24-26

The examiner rejects claims 21, 22, and 24-26 as obvious over *Itagaki* in view of *Schimpe*. The examiner asserts that:

Claims 21-22 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Itagaki* (US5602863) in view of *Schimpe* (US47443083).

With respect to claims 21, 23, and 25, *Itagaki* discloses all limitations of the claims except for a reflective layer. *Schimpe* teaches the reflective surface (col. 5, 1.49). For the benefit of reflecting the light, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide *Itagaki* the reflective surface as taught by *Schimpe*.

With respect to claims 22 and 24, *Itagaki* discloses the gain region having multiple parts in Fig. 3.

With respect to claim 26, *Itagaki* discloses the laser device 100 integrated with other elements 16,20 on a substrate 10 in Fig. 3. Office Action of December 6, 2004, pages 6 and 7.

As shown above, *Itagaki* does not show all the elements of the independent claims from which claims 21, 22, and 24-26 depend. Therefore, the examiner has failed to state prima facie obviousness rejection of these claims.

In addition, the examiner failed to state a prima facie obviousness rejection because the examiner failed to state a motivation to combine the references. The examiner states that "for the benefit of reflecting light" it would have been obvious "to provide *Itagaki* the reflective surface as taught by *Schimpe*." This statement is not a motivation to combine the references. Therefore, the examiner has failed to state a prima facie obviousness rejection.

In addition, the statement "for the benefit of reflecting light" cannot be a proper motivation to combine the references. The examiner provides no indication how reflecting light as shown in *Schimpe* would be of any benefit to the device shown in *Itagaki*. Given the extremely common use of reflectors in many different optical devices, the examiner would have to provide a much more detailed reason why one of ordinary skill would be motivated to add a reflector to *Itagaki*, even if *Itagaki* actually showed the remaining claim limitations of the independent claim. Therefore, the examiner has not stated a proper motivation to combine the references and accordingly has failed to state a prima facie obviousness rejection against claims 21, 22, and 24-26.

In addition, the examiner's statement is so overly broad that it indicates the examiner has simply picked and chosen elements from different aspects of the art and combined them together using Applicants' own disclosure as a motivation to combine the references. Doing so is impermissible hindsight. Thus, the examiner has failed to state a

prima facie obviousness rejection of claims 21, 22, and 24-26. Accordingly, the rejection of these claims has been overcome.

Furthermore, because *Itagaki* and *Schimpe* are so different from each other, the examiner must have simply picked an element out of *Schimpe* and included that element in *Itagaki* without having sufficient reason or justification to do so. Merely picking and choosing elements from references again indicates that the examiner has used impermissible hindsight when combining the references. Accordingly, the examiner has again failed to state a prima facie rejection against these claims.

In addition, the claims are non-obvious in view of *Itagaki* and *Schimpe* because *Itagaki* and *Schimpe* show extremely different inventions. *Itagaki* shows a surface emitting diode array and *Schimpe* shows a cylindrical diffraction grating coupling. No reason exists why one of ordinary skill would recognize how any device in *Schimpe* would be functional in *Itagaki*, and the examiner has failed to cite any reason or motivation to combine such extremely different references. Thus, no motivation exists to combine the references and accordingly the claims are non obvious in view of *Itagaki* and *Schimpe*.

III. SUMMARY OF WHY CLAIMS ARE PATENTABLE OVER THE CITED REFERENCES

Itagaki does not anticipate the claims because *Itagaki* does not show separate waveguides between which an outcoupling is positioned as claimed. In addition, all of the obviousness rejections rely on *Itagaki*; however, *Itagaki* does not show the claimed elements as asserted by the examiner. Therefore, the examiner has failed to state prima facie obviousness rejections against any of the claims. In addition, the examiner failed to provide a proper motivation to combine the references and used improper hindsight when fashioning the obviousness rejections. Thus, the examiner again failed to state prima facie obviousness rejections. Furthermore, *Itagaki* and all of the other references are so different from the claimed inventions that the claims are clearly non-obvious over the cited art.

IV. CONCLUSION

It is respectfully urged that the subject application is patentable over *Itagaki, Schimpe, Horimai and Pepper* and is now in condition for allowance.

The examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

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Respectfully submitted,



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